

1. A coke drum de-header system comprising:
 - (a) a coke drum having at least one port therein, said coke drum receiving material therein from a manufacturing system and process;
 - (b) a de-header valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated de-heading and re-heading of the coke drum, said de-header valve comprising:
 - (1) a main body having an orifice dimensioned to align with said port of said coke drum when said de-header valve is coupled thereto;
 - (2) a valve closure operably supported by said main body, said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port;
 - (3) means for supporting said valve closure;
 - (c) a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure, said contact seal shearing accumulated coke and effectively de-heading said coke drum upon actuation of said valve closure; and
 - (d) means for actuating said valve closure.
- 20 2. The coke drum de-header system of claim 1, wherein said means for supporting said valve closure comprises a seat support system.

3. The coke drum de-header system of claim 2, wherein said seat support system comprises dual, independent seats positioned opposite one another on either side of said valve closure, thus applying opposing forces upon said valve closure, and wherein said seats are selected from a static and a dynamic seat.

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4. The coke drum de-header system of claim 2, wherein said seat support system comprises at least one live loaded seat and seat assembly.

5. The coke drum de-header system of claim 2, wherein said seat support
10 system comprises at least one static seat and seat assembly.

6. The coke drum de-header system of claim 2, wherein said seat support system comprises a static seat positioned opposite a complimentary live loaded seat.

15 7. The coke drum de-header system of claim 1, wherein said de-header valve is selected from the group consisting of a plug valve, a ball or globe valve, a flexible wedge gate valve, a parallel slide gate valve, a solid wedge gate valve, and a sliding blind gate valve.

20 8. The coke drum de-header system of claim 1, wherein said means for supporting said valve closure comprises portions of said main body adapted to support said valve closure and provide said contact seal.

9. The coke drum de-header system of claim 1, further comprising a steam purge system.
10. The coke drum de-header system of claim 1, further comprising an internal material isolation and containment system.

11. A plug-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a plug-type valve closure contained within said main body that rotates to open and close said plug-type de-header valve for de-heading and re-heading of said coke drum;

means for supporting said plug-type valve closure; and

a metal to metal contact seal created between said valve closure and said means

10 for supporting said plug-type valve closure, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a closed position to an open position, thus effectively de-heading said coke drum.

15 12. The plug-type de-header valve of claim 11, wherein said means for supporting said plug-type valve closure comprises a seat support system.

13. The plug-type de-header valve of claim 12, wherein said seat support system comprises dual, independent live loaded dynamic seats positioned on opposing

20 sides of said plug-type valve closure.

14. The plug-type de-header valve of claim 12, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said plug-type valve closure.

5 15. The plug-type de-header valve of claim 12, wherein said seat support system comprises a single seat positioned about said plug-type valve closure, said single seat selected from the group consisting of a dynamic and static seat.

10 16. The plug-type de-header valve of claim 11, wherein said means for supporting said plug-type valve closure comprises at least a portion of said main body adapted to receive said plug-type valve closure and capable of forming and maintaining said contact seal.

17. A ball-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a ball-type valve closure contained within said main body that rotates to open and close said plug-type de-header valve for de-heading and re-heading of said coke drum;

means for supporting said ball-type valve closure; and

a metal to metal contact seal created between said valve closure and said means

10 for supporting said ball-type valve closure, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a closed position to an open position, thus effectively de-heading said coke drum.

15 18. The ball-type de-header valve of claim 17, wherein said means for supporting said ball-type valve closure comprises a seat support system.

19. The ball-type de-header valve of claim 18, wherein said seat support system comprises dual, independent live loaded dynamic seats positioned on opposing

20 sides of said ball-type valve closure.

20. The ball-type de-header valve of claim 18, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said ball-type valve closure.

5 21. The ball-type de-header valve of claim 18, wherein said seat support system comprises a single seat positioned about said ball-type valve closure, said single seat selected from the group consisting of a dynamic and static seat.

22. The ball-type de-header valve of claim 17, wherein said means for
10 supporting said ball-type valve closure comprises at least a portion of said main body
adapted to receive said ball-type valve closure and capable of forming and maintaining
said contact seal.

23. An adjusting wedge gate-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a valve closure contained within said main body and comprising at least one adjusting wedge gate that oscillates back and forth in a linear, bi-directional manner to open and close said adjusting wedge gate-type de-header valve for de-heading and re-heading said coke drum;

means for supporting said adjusting wedge gate, said means situated and oriented 10 in a substantial wedge shape and dictating the adjustment of said adjusting wedge gate; and

a metal to metal contact seal created between said valve closure and said means for supporting said adjusting wedge gate, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a 15 closed position to an open position, thus effectively de-heading said coke drum.

24. The adjusting wedge gate-type de-header valve of claim 23, wherein said means for supporting said adjusting wedge gate comprises a seat support system.

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25. The adjusting wedge gate-type de-header valve of claim 24, wherein said seat support system comprises dual, independent live loaded dynamic seats positioned on opposing sides of said adjusting wedge gate.

26. The adjusting wedge gate-type de-header valve of claim 24, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said adjusting wedge gate.

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27. The adjusting wedge gate-type de-header valve of claim 24, wherein said seat support system comprises a single seat positioned about said adjusting wedge gate, said single seat selected from the group consisting of a dynamic and static seat.

10 28. The adjusting wedge gate-type de-header valve of claim 23, wherein said means for supporting said adjusting wedge gate comprises at least a portion of said main body adapted to receive said adjusting wedge gate and capable of forming and maintaining said contact seal.

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29. A flexible wedge gate-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a valve closure contained within said main body and comprising at least one flexing wedge gate that oscillates back and forth in a linear, bi-directional manner to open and close said flexible wedge gate-type de-header valve for de-heading and re-heading said coke drum, said flexing wedge gate having an initial unflexed shape;

10 means for supporting said flexing wedge gate, said means situated and oriented in a substantial wedge shape and causing said flexing wedge gate to flex from said unflexed shape and conform to the orientation of said means supporting a valve closure; and

a metal to metal contact seal created between said valve closure and said means

15 for supporting said flexing wedge gate, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a closed position to an open position, thus effectively de-heading said coke drum.

20 30. The flexible wedge gate-type de-header valve of claim 29, wherein said means for supporting said flexing wedge gate comprises a seat support system.

31. The flexible wedge gate-type de-header valve of claim 30, wherein said seat support system comprises dual, independent live loaded dynamic seats positioned on opposing sides of said flexing wedge gate.

5 32. The flexible wedge gate-type de-header valve of claim 30, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said flexing wedge gate.

10 33. The flexible wedge gate-type de-header valve of claim 30, wherein said seat support system comprises a single seat positioned about said flexing wedge gate, said single seat selected from the group consisting of a dynamic and static seat.

15 34. The flexible wedge gate-type de-header valve of claim 29, wherein said means for supporting said flexing wedge gate comprises at least a portion of said main body adapted to receive said flexing wedge gate and capable of forming and maintaining said contact seal.

35. A parallel slide gate-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a valve closure contained within said main body and comprising at least one biased wedge gate that oscillates back and forth in a linear, bi-directional manner to open and close said parallel slide gate-type de-header valve for de-heading and re-heading said coke drum;

means for supporting said biased wedge gate; and

10 a metal to metal contact seal created between said valve closure and said means for supporting said biased wedge gate, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a closed position to an open position, thus effectively de-heading said coke drum.

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36. The parallel slide wedge gate-type de-header valve of claim 35, wherein said means for supporting said biased wedge gate comprises a seat support system.

37. The parallel slide wedge gate-type de-header valve of claim 36, wherein

20 said seat support system comprises dual, independent live loaded dynamic seats positioned on opposing sides of said biased wedge gate.

38. The parallel slide wedge gate-type de-header valve of claim 36, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said biased wedge gate.

5 39. The parallel slide wedge gate-type de-header valve of claim 36, wherein said seat support system comprises a single seat positioned about said biased wedge gate, said single seat selected from the group consisting of a dynamic and static seat.

10 40. The parallel slide gate-type de-header valve of claim 35, wherein said means for supporting said biased wedge gate comprises at least a portion of said main body adapted to receive said biased wedge gate and capable of forming and maintaining said contact seal.

41. A solid wedge gate-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a valve closure contained within said main body and comprising a solid gate having a substantially wedge shape, said valve closure oscillates back and forth in a linear, bi-directional manner to open and close said solid wedge gate-type de-header valve for de-heading and re-heading said coke drum;

means for supporting said solid gate; and

10 a metal to metal contact seal created between said valve closure and said means for supporting said solid gate, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a closed position to an open position, thus effectively de-heading said coke drum.

15 42. The solid wedge gate-type de-header valve of claim 41, wherein said means for supporting said solid gate comprises a seat support system.

43. The solid wedge gate-type de-header valve of claim 42, wherein said seat support system comprises dual, independent live loaded dynamic seats positioned on

20 opposing sides of said solid gate.

44. The solid wedge gate-type de-header valve of claim 42, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said solid gate.

5 45. The solid wedge gate-type de-header valve of claim 42, wherein said seat support system comprises a single seat positioned about said solid gate, said single seat selected from the group consisting of a dynamic and static seat.

10 46. The solid wedge gate-type de-header valve of claim 41, wherein said means for supporting said solid gate comprises at least a portion of said main body adapted to receive said solid gate and capable of forming and maintaining said contact seal.

47. A sliding blind gate-type de-header valve comprising:

a main body removably coupled to a coke drum, wherein said main body comprises an orifice dimensioned to align with an opening of said coke drum;

5 a valve closure comprising a blind capable oscillating in a linear manner to open and close said de-header valve and for de-heading and re-heading said coke drum;

means for supporting said blind; and

a metal to metal contact seal created between said valve closure and said means

10 for supporting a valve closure, said contact seal shearing an accumulated head of coke upon actuation of said valve closure from a closed position to an open position, thus effectively de-heading said coke drum.

48. The sliding blind gate-type de-header valve of claim 47, wherein said

15 means for supporting said blind comprises a seat support system.

49. The sliding blind gate-type de-header valve of claim 48, wherein said seat

support system comprises dual, independent live loaded dynamic seats positioned on opposing sides of said blind.

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50. The sliding blind gate-type de-header valve of claim 48, wherein said seat support system comprises dual, independent static seats positioned on opposing sides of said blind.

51. The sliding blind gate-type de-header valve of claim 48, wherein said seat support system comprises a single seat positioned about said blind, said single seat selected from the group consisting of a dynamic and static seat.

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52. The sliding blind gate-type de-header valve of claim 47, wherein said means for supporting said blind comprises at least a portion of said main body adapted to receive said blind and capable of forming and maintaining said contact seal.

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53. A globe-type de-header valve comprising:

a main body having a flanged portion for removably connecting to a coke drum;

a globe-type valve closure contained within said main body that oscillates to open

and close said globe-type de-header valve for de-heading and re-heading

5 of said coke drum;

means for supporting said globe-type valve closure;

a metal to metal contact seal created between said valve closure and said means

for supporting said globe-type valve closure, said contact seal shearing an

accumulated head of coke upon actuation of said valve closure from a

10 closed position to an open position, thus effectively de-heading said coke

drum.

54. The globe-type de-header valve of claim 53, wherein said means for

supporting said globe-type valve closure comprises a seat support system.

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55. The globe-type de-header valve of claim 54, wherein said seat support

system comprises dual, independent live loaded dynamic seats positioned on opposing

sides of said globe-type valve closure.

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56. The globe-type de-header valve of claim 54, wherein said seat support

system comprises dual, independent static seats positioned on opposing sides of said

globe-type valve closure.

57. The globe-type de-header valve of claim 54, wherein said seat support system comprises a single seat positioned about said globe-type valve closure, said single seat selected from the group consisting of a dynamic and static seat.

5 58. The globe-type de-header valve of claim 53, wherein said means for supporting said globe-type valve closure comprises at least a portion of said main body adapted to receive said globe-type valve closure and capable of forming and maintaining said contact seal.